Investigating the Relationship between Winter Recreation and Wolverine Spatial Use in Central Idaho

Phase I Completion Report – Helicopter Surveys to Document Occurrence and Distribution of Wolverine and Winter Recreation

Phase II Summary Outline and Timetable

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EXECUTIVE SUMMARY

As a first step in pursuing an understanding of the impacts of winter recreation on wolverine, we initiated an aerial survey on the Payette, Boise, and Sawtooth National Forests to document the presence and distribution of wolverine, snowmobile, and skier activity. The survey area was delineated by the distribution of potential wolverine habitat overlaid by a 10 km X 10 km grid. Each of 146 grid cells was over-flown by helicopter wherein observers recorded instances of wolverine tracks, and snowmobile and skier presence. Approximately 60 hours of helicopter time was required to survey all grid cells. Wolverine tracks were observed in 20 grid cells; evidence of snowmobile activity occurred in 84 cells; and skier presence was evident in 14 cells. These results support the initiation of an investigation to evaluate the relationship between wolverine and winter recreation. We outline objectives and a timetable for continuation.

INTRODUCTION

State and Federal natural resource managers have expressed concerns about the potential impact of winter motorized and non-motorized recreation on wolverine populations since the 1980s. Advances in snowmobile technology and increasing interest in winter backcountry recreation have converted remote areas used by wolverines for reproductive denning, into winter playgrounds. Our current understanding of wolverine denning habitat selection is limited to only a small number of dens. However, all documented dens have occurred in areas that are currently closed to motorized winter travel. Research to date has documented several instances of den abandonment in response to snowmobile and heli-ski presence, but also instances where human disturbance did not result in den abandonment. Such inconsistencies typify the problems encountered when dealing with anecdotal information.

The lack of research directed at this issue is due largely to the expense and difficulty inherent with the study of wolverine populations and the study of human/wildlife conflicts, in general. Knowledge of wolverine presence in an area, most commonly based on observational data, contributes to our understanding of wolverine presence, but it can be misleading (wolverine observational reports tend to occur in places where people are most common) and as such is often not representative or indicative of distribution. The spatial and temporal distribution of human winter recreation is equally unclear due to inadequate personnel and resources for monitoring recreational activities. Wolverine ecology field research over the past 15 years has shown a degree of overlap between winter recreation areas and habitat preferred by wolverines for reproductive denning and kit rearing. While research has reinforced concerns regarding potential conflict, the scientific basis for management continues to rely primarily on anecdotal accounts of the wolverine's response to human-related disturbance.

METHODS

Ten kilometer grid cells, approximating the home range of an adult male wolverine, were laid over a wolverine habitat model (Copeland et al. *in review*) projected across 3 National Forests (Payette, Boise, and Sawtooth) (Fig. 1). To be included in the survey, grid cells were required to provide a minimum of 30% of their area as predicted wolverine habitat. A minimum of 2 observers surveyed each grid cell from a Bell L3 helicopter following straight-line, diagonal transects across each cell. Minimum deviations from straight line were allowed if necessary to keep the helicopter above predicted habitat. The helicopter maintained an altitude of approximately 300m above ground level and an air speed of approximately 52 knots/hour to keep search time/cell at approximately 10 minutes. Observers searched for and recorded track evidence of wolverines, snowmobiles, and skiers. A primary observer was designated to make final decisions on any questionable tracks. Snowmobile and skier track presence within a cell was subjectively classified as high, medium, or low intensity. Detection of a wolverine track suspended further wolverine track searches within that cell, although recreation activity was continually recorded.

Our ability to detect tracks was dependent both on the condition of the snow layer, and the probability that wolverines in the area were leaving tracks in the snow. The ideal opportunity to detect tracks in the snow is presented within some time period subsequent to a fresh snowfall; a recent snowfall will provide fresh, but few, tracks, while an aged snowfall will provide many tracks that are more difficult to identify due to degrading snow conditions. Wolverines are reputedly able to move considerable distances over a short period of time. To determine the extent to which this occurs, and an optimal time period to wait subsequent to a new snowfall, we calculated distances moved for varying periods of time for wolverines associated with a recent telemetry study in Glacier National Park (Copeland, unpublished data). As our interest was in delineating distribution, as well as occurrence, we planned for a minimum of 2 replicates with the assumption that multiple tracks among replicates would indicate residency.

RESULTS

The 3 forests encompass over 26,500 km^2, 42.3% of which (11,198 km^2) was classified as potential wolverine habitat. One hundred and fifty grid cells across all 3 forests met the 30% criteria (Fig 1). The estimated cost of surveying each of 150 cells for a minimum of 2 replicates exceeded our budget allowances so we mitigated costs by flying every other transect line (Fig 2). Over 2 replicates this resulted in a single search of each grid cell. We surveyed 146 of the 150 grid cells. Survey flights occurred over 7 days from February 21 to April 7 and required approximately 60 hours of flight time at a cost of approximately $61,000, or, an estimated $411/cell surveyed. Average search time/cell was 9 minutes (SD=2.5). Observers considered 20 observed tracks as wolverine, with 67% of the cells classified with some level of recreational activity (Fig. 3, Table 1).

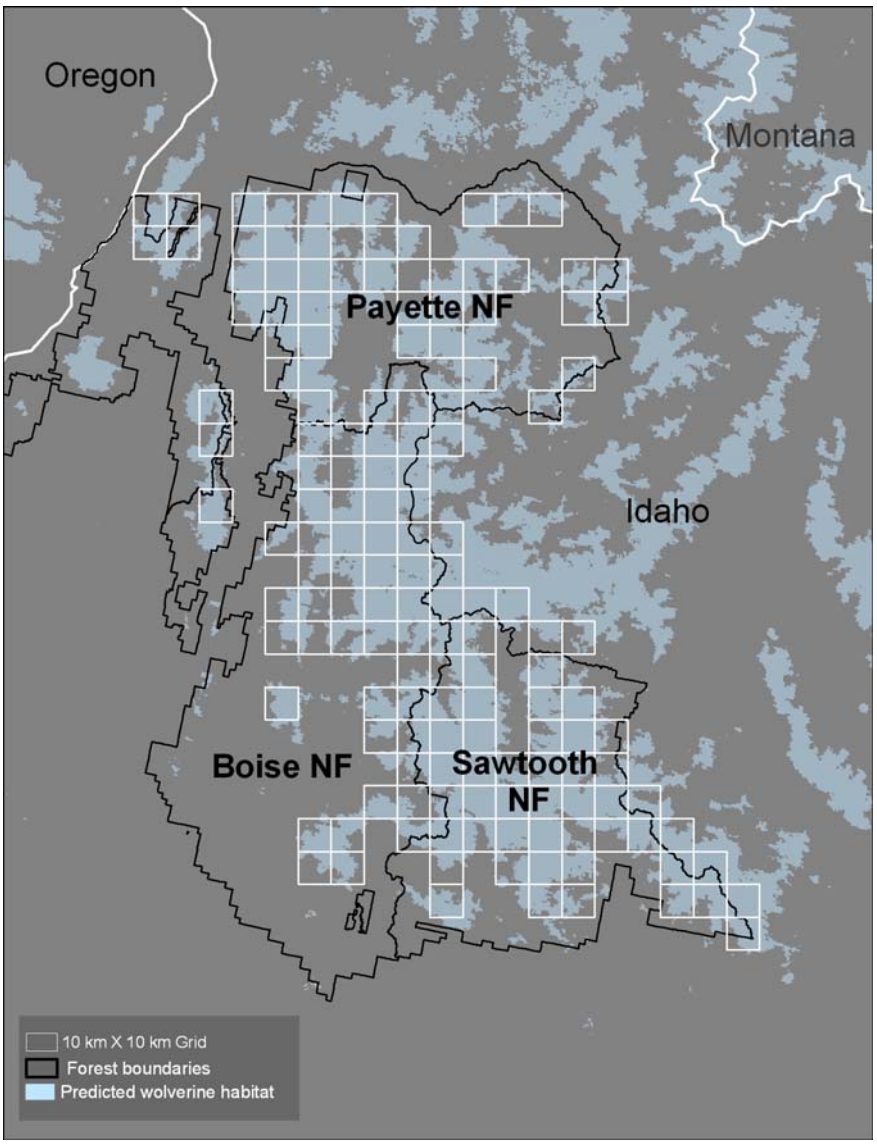

Figure 1. Central Idaho National Forests participating in wolverine/recreation survey, their relationship with the distribution of predicted wolverine habitat, and the distribution of survey grid cells.

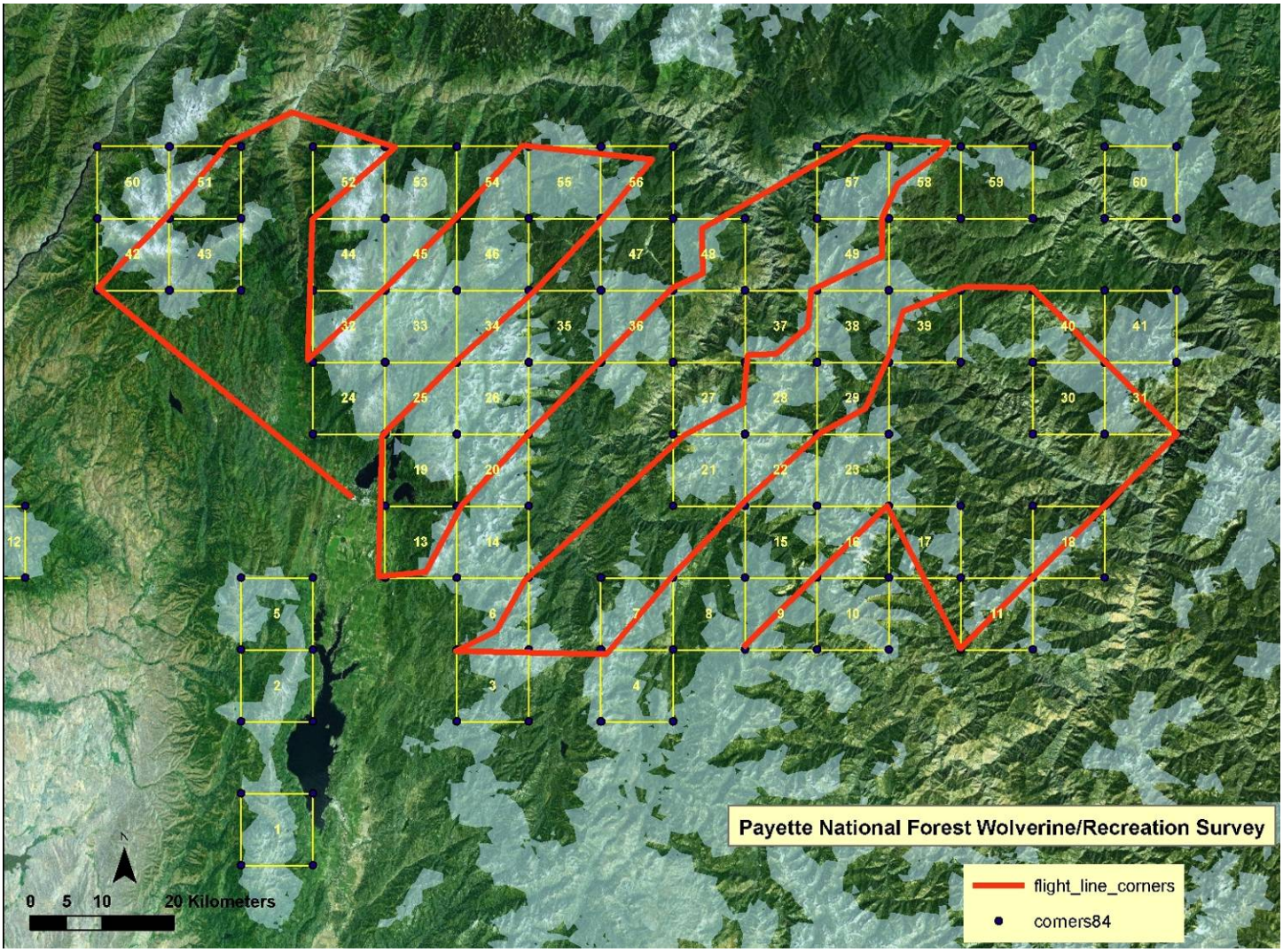

Figure 2. Payette National Forest survey grid with proposed flight line illustrating diagonal flight across alternating rows of grid cells. The second replicate included all cells not surveyed during the first flight.

Table 1. Number of survey grid cells subjectively classified as absent (0), low (1), medium (2), or high (3) intensity recreational use.

	Recreation intensity code				
Activity	0	1	2	3	Total
Ski	-	5	2	7	14
Snowmobile	-	38	22	24	84
Both	-	2	1	7	10
Total	58	41	23	24	146

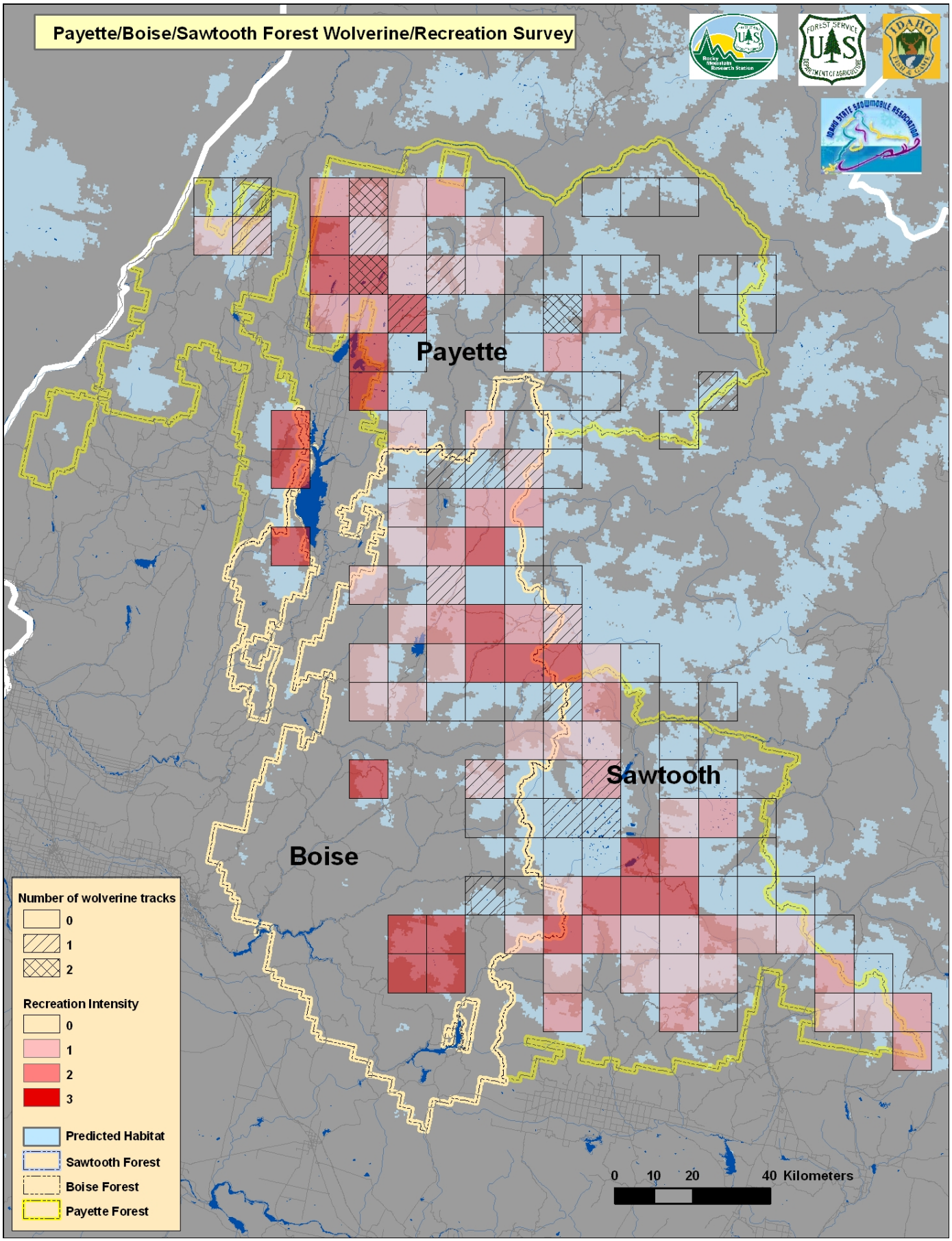

Figure 3. Survey results from wolverine/recreation survey in central Idaho, 2009.

DISCUSSION

Our survey followed a design developed for Yellowstone National Park (YNP)(unpublished data), which indicated that a wolverine within an occupied home range could be detected, using this methodology, at a probability approaching 100%. The YNP survey differed primarily in that the YNP survey involved 3 replicates, whereas this survey only completed 2 replicates. The most notable result relative to wolverine distribution in our study area was the lack of detections across the SE portion of the Sawtooth NF; specifically, the Boulder/White Cloud/Pioneer complex. Both recent and historical information indicate wolverine presence in these areas. As such, we should view these results as a generalized indication of wolverine occurrence.

The surveys were also informative in regard to the distribution of recreational activities. Our original objective was to identify areas with and without recreational impact for the purpose of selecting paired study sites from which we could compare variation in wolverine movements, demographics, and habitat use. Given the wide-ranging nature of the wolverine and the prevalence of ski and snowmobile activity across the Forests (Fig. 3), finding a site that provides a complete absence of recreation activity may be unrealistic.

Phase II Objectives

These results confirm that wolverine and winter recreational activities occur throughout these portions of central Idaho to a degree that more intensive research is warranted. As such, it is our intent to initiate a winter research effort to further clarify the relationship. The study will be led by a Rocky Mountain Research Station scientist in cooperation with project collaborators. A study plan will be developed and provided for review to all collaborators, and formulated to address the feasibility of the following questions:

1. What is the spatial and temporal relationship between wolverine and winter recreation?

- Our surveys confirm a spatial and temporal overlap at the scale of the 3-Forest study area, while at the scale of our survey grid (100 km^2) 58% of cells in which wolverine were detected, also experienced recreation. Continuing with this logic, we will further refine the scales of spatial and temporal correlation.

- At issue is the concern that winter recreation may disturb or displace reproductive denning females. We will investigate the spatial proximity and habitat characteristics of reproductive dens and preferred recreational habitat.

2. Does winter recreation influence wolverine demographics and habitat use?

- Study duration and the number of replicate study areas will determine our ability to measure differences in population demographics. While it is unlikely we will ever be able to conclude an effect beyond correlational inference, we will be able to compare population metrics across study area replicates, and with data provided by other studies.

- We will design a sampling protocol that will allow us to measure wolverine spatial and temporal habitat use relative to recreational activity by combining GPS telemetry technology with intensive recreational surveys. High frequency GPS relocations will provide a foundation for movement analyses, which can be directly coupled with data that delineates temporal and spatial recreational presence.

Traditionally, wolverine studies are forced into functioning over extremely large areas in order to develop adequate sample sizes for robust empirical analyses. As such, project resources are generally strained and limited. In this study we will attempt to focus an intensive investigation within a relatively small study area, which can be managed by a single field crew. Based on our experience in other study areas, we can expect our capture rate to approach 100% of the local population. The strength of our conclusions, and our ability to generalize beyond the study area, will be dependent on adding replicate study areas over time. We will begin on the Payette NF north of McCall, Idaho, and the north end of the Boise NF, as directed by our winter surveys, where we will plan for a 3-4 year operation. Depending on the continued availability of funding, we will then move the study area to the Sawtooth and/or Boise National Forests and begin a replicate study. The availability of funding and the rigor of our data will determine the potential and need for further replicates. Year one, on the Payette Forest, will serve as a pilot season in which we will test and tune methodology, as well as strengthen and develop collaborations.

TIMETABLE

2009
Present – September: Develop collaborations, interview for lead field scientist, begin progress on project logistics (equipment, housing, budgets…)

September – December: Select trapping sites and build log box traps, order and organize equipment (processing equipment, radio collars, vehicles, housing…)

2010
January – April: Capture and mark study animals, test telemetry equipment, experiment with recreation monitoring procedures, monitor instrumented females for reproductive denning activity.

May: Capture and instrument kits at den sites

June – December: Visit den sites during snow-free period to describe den structure and related habitat. Revisit study plan for modifications. Prepare annual report.